

WHAT IS CLAIMED IS:

1. A method of warming up a fuel evaporator, the fuel evaporator comprising:

an evaporation chamber equipped with a first injection device  
5 for injecting raw fuel liquid onto a heat source, and vaporizing  
the raw fuel liquid on the heat source;

a catalyst combustor having a combustion catalyst, and  
introducing catalytically burned combustion gas into the heat  
source of said evaporation chamber;

10 a second injection device for supplying fuel to said catalyst  
combustor;

a combustion gas transferring device equipped with a fuel  
injection portion and a combustion catalyst, and the fuel injection  
portion injecting fuel onto the combustion catalyst to generate  
15 a catalytically burned gas, which is then transferred to the  
catalyst combustor;

a first temperature measurement device for measuring a  
temperature of said catalyst combustor; and

a second temperature measurement device for measuring a  
20 temperature of said evaporation chamber,

wherein the method comprising the steps of:

transferring the combustion gas with the combustion gas  
transferring device;

stopping the combustion gas transferring device in accordance  
25 with a temperature of said catalyst combustor measured by the first

temperature measurement device, and transferring fuel to said catalyst combustor with the second injection device; and

injecting the raw fuel liquid from the first injection device in accordance with a temperature of said evaporation chamber  
5 measured by the second temperature measurement device so as to vaporize the raw fuel liquid within the evaporation chamber.

2. A method of warming up a fuel evaporator according to claim 1, wherein air is supplied to the fuel injection portion of said combustion gas transferring device, and thereafter, while  
10 continuously supplying air, said fuel injection portion starts to inject fuel when the electrically heated combustion catalyst of said combustion gas transferring device is thermally activated.

3. A method of warming up a fuel evaporator according to claim 1, wherein said combustion gas transferring device stops  
15 to inject fuel when said catalyst combustor rises to a temperature, at which the combustion catalyst thereof is thermally activated.

4. A method of warming up a fuel evaporator according to claim 2, wherein a small amount of air is continuously supplied to said fuel injection portion after said combustion gas  
20 transferring device is stopped.

5. A method of warming up a fuel evaporator according to claim 2, wherein a small amount of fuel and air is flown from the fuel injection portion of said combustion gas transferring device in accordance with a temperature of said catalyst combustor,  
25 so as to promote vaporization of the fuel injected from said second injection device.

6. A method of warming up a fuel evaporator according to claim 1, wherein raw fuel liquid is injected from said first injection device onto said heat source when a temperature of the combustion gas, which has passed through the fuel evaporator, rises above a certain temperature corresponding to a heating capacity of said evaporation chamber.

7. A method of warming up a fuel evaporator according to claim 1, wherein warming-up of the fuel evaporator is finished when a temperature of raw fuel gas, which is generated by vaporizing the raw fuel liquid, rises to a certain temperature suitable for a subsequent reforming reaction.

8. A method of warming up a fuel evaporator according to claim 1, wherein said first temperature measurement device and said second temperature measurement device are temperature sensors comprising a thermocouple.

9. A method of warming up a fuel evaporator according to claim 1, wherein said heat source is formed by a plurality of heating medium tubes.

10. A method of warming up a fuel evaporator, the fuel evaporator comprising:

an evaporation chamber equipped with a first injection device for injecting raw fuel liquid onto a heat source, and vaporizing the raw fuel liquid on the heat source;

a catalyst combustor having a combustion catalyst, and introducing catalytically burned combustion gas into the heat source of said evaporation chamber;

a second injection device for supplying fuel to said catalyst combustor;

a combustion gas transferring device equipped with a fuel injection portion and a combustion catalyst, and the fuel injection  
5 portion injecting fuel onto the combustion catalyst to generate a catalytically burned gas, which is then transferred to the catalyst combustor;

a first temperature measurement device for measuring a temperature of said catalyst combustor; and

10 a second temperature measurement device for measuring a temperature of said evaporation chamber,  
wherein the method comprising the steps of:

transferring the combustion gas with the combustion gas transferring device;

15 transferring fuel to said catalyst combustor with the second injection device, while transferring the combustion gas with the combustion gas transferring device in accordance with a temperature of said catalyst combustor measured by the first temperature measurement device, and

20 injecting the raw fuel liquid from the first injection device in accordance with a temperature of said evaporation chamber measured by the second temperature measurement device so as to vaporize the raw fuel liquid within the evaporation chamber.

11. A method of warming up a fuel evaporator according  
25 to claim 10, wherein air is supplied to the fuel injection portion of said combustion gas transferring device, and thereafter, while

continuously supplying air, said fuel injection portion starts to inject fuel when the electrically heated combustion catalyst of said combustion gas transferring device is thermally activated.

12. A method of warming up a fuel evaporator according to claim 10, wherein raw fuel liquid is injected from said first injection device onto said heat source when a temperature of the combustion gas, which has passed through the fuel evaporator, rises above a certain temperature corresponding to a heating capacity of said evaporation chamber.

13. A method of warming up a fuel evaporator according to claim 10, wherein warming-up of the fuel evaporator is finished when a temperature of raw fuel gas, which is generated by vaporizing the raw fuel liquid, rises to a certain temperature suitable for a subsequent reforming reaction.

14. A method of warming up a fuel evaporator according to claim 10, wherein said first temperature measurement device and said second temperature measurement device are temperature sensors comprising a thermocouple.

15. A method of warming up a fuel evaporator according to claim 10, wherein said heat source is formed by a plurality of heating medium tubes.